

THIS PAGE BLANK (USPTO)

1702 *

In a phone conversation with the Examiner, Mr. Arthur L. Corbin on September 9, 2003, Mr. Corbin suggested that Applicant file this request. Applicant is following the Examiner's kind suggestion.

Applicant respectfully requests the issuance of a revised Notice of Allowability indicating the acknowledgement of the claim for foreign priority.

It is believed that no additional fees are due in connection with this filing. However, in the event that any fees are necessary, the Commissioner is hereby authorized to charge our Deposit Account No. 50-0206.

Respectfully submitted,

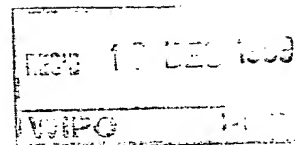
HUNTON & WILLIAMS


Stanislaus Aksman
Registration No. 28,562

Date: September 15, 2003

1900 K Street, N.W., Suite 1200
Washington, D.C. 20006-1109
Ph. (202) 955-1500
Fax (202) 778-2201

THIS PAGE BLANK (USPTO)



Kongeriget Danmark

Patent application No.: PA 1998 01540

Date of filing: 23 Nov1998

Applicant: Dandy A/S
Dandyvej 19
DK-7100 Vejle

This is to certify the correctness of the following information:

The attached photocopy is a true copy of the following document:

- The specification, claims and drawings as filed with the application on the filing date indicated above



**Patent- og
Varemærkestyrelsen**

Erhvervsministeriet

TAASTRUP 09 Dec 1999

Lizzi Vester
Head of Section

PRIORITY DOCUMENT

SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH RULE 17.1(a) OR (b)

dtaget PD
23 NOV. 1998

1

USE OF NATURAL VEGETABLE COMPONENTS AS FLAVOURING AGENTS IN CHEWING GUM

The present invention relates to the use of natural vegetable flavouring components as
5 flavouring agents in chewing gum formulations.

According to the present invention it has surprisingly been found that addition of a natural vegetable component to a chewing gum formulation results in increased flavour sensation.

10

The aroma agents and flavours generally used in chewing gum formulations are for instance natural and synthetic flavourings in the form of essential oils, essences, and extracts. The flavours may be in the form of liquids or powders. The powders are normally prepared on the basis on liquid essences or extracts.

15

Natural flavours are commonly subject to deterioration due to heat treatment, contact with air, light and moisture. In addition, natural flavours may due to the preparation method, lack the natural taste sensation because many taste notes of the original product are changed or disappears during the processes. Accordingly, the overall taste
20 sensation is changed.

Patent application CA 2,027,177 disclose use of fruit juice concentrate as a flavouring agent.

25 BRIEF DESCRIPTION OF THE INVENTION

According to the present invention, it has surprisingly been found that natural flavour sources such as dried fruits or other vegetable material in its natural form or dried form are excellent flavours in chewing gum formulations. The natural fruits are useful
30 flavours and is preferable used in the water-soluble portion, in the coating of the chewing gum and may also be added to the water-insoluble gum base.

It is believed that the surprising effect of the natural vegetable flavouring component according to the present invention is not only due to a minimal treatment of the

2

natural vegetable flavouring agent but is also related to the content of cellular material from the plant. The cellular material may serve as reservoir for the flavouring components and may also help to preserve the sensible chemical structure of the natural selection of flavouring components. When both a great part of the flavouring components are retained as well as in the natural ratios, a very natural taste sensation is obtained. In addition, by being released during the chewing period of a chewing gum where saliva solubilize the different taste components in a way which is very similar to the normal chewing of e.g. a fruit, the consumer experience a much more natural taste sensation than may be obtained by conventional flavours including flavours prepared on the basis of natural products such as from juices. Accordingly, in a preferred embodiment the natural vegetable flavouring agent of the present invention comprises more or less intact cellular components.

Flavour powders known in the art are conventionally prepared by spray drying of aqueous solutions, essences or extracts and drying with hot air. However, during the process the flavour loses the characteristics of the natural taste the liquid flavour might have. Initially, the liquid may already have lost a great part of the full taste sensation of the original product as liquid flavour lacks the full taste characteristics of the original product.

20

Furthermore, the taste sensation during the complete chewing process is of great importance for the customer. It has now surprisingly been found that use of a dried natural flavouring agent according to the present invention may improve the taste sensation of a chewing gum. With relative small amounts of freeze-dried natural vegetable flavouring components the following improved characteristics have been identified: less perfumed taste, less synthetic taste, less astringent sensation, increased intensity, increased impact, increased sourness and freshness.

In addition to the increase in taste sensation the use of the natural flavouring components also results in a chewing gum formulation wherein synthetic colouring agents can be avoided. In a preferred embodiment, the natural flavouring component is used in the dragee layer resulting in an excellent taste as well as colour of the chewing gum product.

3

Examples natural vegetable flavouring agents according to the present invention are preferable fruits and herbs and include coconut, grape fruit, orange, lime, lemon, mandarin, pineapple, strawberry, raspberry, tropical fruits such as mango, passionfruit, kiwi; apple, pear, peach, strawberry, apricot, raspberry, cherry,

- 5 pineapple, grapes, banana, cranberry, blueberry, blackcurrent, redcurrent, gooseberry, and lingonberries. The herbs include thyme, basil, camille, valerian, fennel, parsley, camomille, tarragon, lavender, dill, cumin, bergamot, salvia, aloe verae and balsam. Also aromatic vegetables such as tomatoes may be used according to the present invention.

10

Also other plants known as spearmint, peppermint, and eucalyptus are useful flavouring agents according to the invention.

- The vegetable flavouring component agent may include all parts of the plant, however, 15 the most aromatic part are preferred such as e.g. the leaves of the eucalyptus and will be known by the skilled person.

As is well known in the art, chewing gum comprises an insoluble gum part and a water-soluble part. The Standard gum bases generally contain elastomers, resins, fats, 20 oils, waxes, emulsifiers and inorganic fillers.

DETAILED DESCRIPTION OF THE INVENTION

- 25 Preferred embodiments of the invention appears from the claims.

The gum base may be any conventional formulation and includes formulations wherein the chewing gum base contains about 5 weight-% to 50 weight-% elastomer which may be of natural or more preferred of synthetic origin, about 5 to about 55 weight-% 30 elastomer plasticizer, about 0 to 50 weight-% filler, about 5 to about 35 weight-% softener, and optional minor amounts (about 1 % or less) of miscellaneous ingredient such as antioxidants, colorants, etc.

- According to the present text, the term softener is used for ingredients, which soften 35 the gum or chewing gum formulation and encompass wax, fat, oil, emulsifiers, surfactants, solubilizers etc.

The gum base used in the chewing gum according to the invention is generally prepared in a conventional manner by heating and mixing the different ingredients such as elastomers, resins, inorganic fillers, waxes, fats, and emulsifiers etc.

- 5 The insoluble gum base generally comprises fats and oils, resins, elastomers, softeners, and inorganic fillers. The gum base may or may not include wax. The insoluble gum base can constitute approximately 5 to about 95 percent, by weight, of the chewing gum, more commonly, the gum base constitutes 10 to about 50 percent
20 of the gum, and in a preferred embodiment, 20 to about 35 percent, by weight, of the chewing gum formulation.

- Synthetic elastomers may include, but are not limited to, polyisobutylene with a GPC weight average molecular weight of about 10,000 to about 95,000, isobutylene-
15 isoprene copolymer (butyl elastomer), styrene-butadiene copolymers having styrene-butadiene ratios of about 1:3 to about 3:1, polyvinyl acetate having a GPC weight average molecular weight of about 2,000 to about 90,000, polyisoprene, polyethylene, vinyl acetate-vinyl laurate copolymer having vinyl laurate content of about 5 to about 50 percent by weight of the copolymer, and combinations thereof.
20 Preferred ranges are, for polyisobutylene, 50,000 to 80,000 GPC weight average molecular weight, for styrene-butadiene, 1:1 to 1:3 bound styrene-butadiene, for polyvinyl acetate, 3,000 to 80,000 GPC weight average molecular weight with the higher molecular weight polyvinyl acetates typically used in bubble gum base, and for vinyl acetate-vinyl laurate, vinyl laurate content of 10-45 percent.

- 25 Natural elastomers may include natural rubber such as smoked or liquid latex and guayule as well as natural gums such as jelutong, lechi caspi, massaranduba balata, sorva, perillo, rosindinha, massaranduba chocolate, chicle, nispero, gutta hang kang, and combinations thereof. The preferred synthetic elastomer and natural elastomer
30 concentrations vary depending on whether the chewing gum in which the base is used is adhesive or conventional, bubble gum or regular gum, as discussed below. Preferred natural elastomers include jelutong, chicle, massaranduba balata and sorva.

5

Elastomers plasticizers may include, but are not limited to, natural rosin esters, often called estergums, such as glycerol esters of partially hydrogenated rosin, glycerol esters polymerized rosin, glycerol esters of partially dimerized rosin, glycerol esters of rosin, pentaerythritol esters of partially hydrogenated rosin, methyl and partially hydrogenated methyl esters of rosin, pentaerythritol esters of rosin; synthetics such as terpene resins derived from alpha-pinene, beta-pinene, and/or d-limonene; and any suitable combinations of the foregoing. The preferred elastomer will also vary depending on the specific application, and on the type of elastomer which is used. Fillers/texturizers may include magnesium and calcium carbonate, ground limestone, silicate types such as magnesium and aluminium silicate, clay, alumina, talc, titanium oxide, mono-, di- and tri-calcium phosphate, cellulose polymers, such as wood, and combinations thereof.

In an embodiment of the invention, softeners/emulsifiers may include tallow, hydrogenated tallow, hydrogenated and partially hydrogenated vegetable oils, cocoa butter, glycerol monostearate, glycerol triacetate, lecithin, mono-, di- and triglycerides, acetylated monoglycerides, fatty acids (e.g. stearic, palmitic, oleic and linoleic acids), and combinations thereof.

According to a further embodiment of the invention, sucrose fatty acid esters are used for increasing the flavour properties of chewing gum formulations.

In addition to the natural flavour agent according to the invention, the chewing gum formulation may comprise conventional flavours. The aroma agents and flavours usable for the compositions according to the present invention are for instance natural and synthetic flavourings (including nature identical flavourings) in the form of essential oils, essences, extracts, powders, including acids and other substances capable of affecting the taste profile. Examples of liquid and powdered flavourings include coconut, coffee, chocolate, vanilla, grape fruit, orange, lime, menthol, liquorice, caramel aroma, honey aroma, pineapple, strawberry, raspberry, tropical fruits, cherries, cinnamon, peppermint, wintergreen, spearmint, eucalyptus, and mint, fruit essence such as from apple, pear, peach, strawberry, apricot, raspberry, cherry, pineapple, and plum essence. The essential oils include peppermint, spearmint, menthol, eucalyptus, clove oil, bay oil, anise, thyme, cedar leaf oil, nutmeg, and oils of the fruits mentioned above.

In addition to the natural vegetable flavouring agents according to the present invention, various synthetic flavours, may also be used if desired. The conventional aroma agents and/or flavours may be used in an amount of from 0.01 to about 30 weight-% of the final product depending on the intensity of the aroma and/or flavour used. Preferably, the content of aroma/flavour is in the range of from 0.2 to 3% of the total composition.

Colorants and whiteners may include FD&C-type dyes and lakes, fruit and vegetable extracts, titanium dioxide, and combinations thereof.

The base may or may not include wax. Waxes may include synthetic waxes such as microcrystalline or paraffin waxes, or natural waxes such as carnauba, beeswax, candellila, or polyethylene wax.

15

In addition to a water insoluble gum base portion, a typical chewing gum composition includes a water soluble bulk portion. The water soluble portion can include bulk sweeteners, high intensity sweeteners, flavouring agents, softeners, emulsifiers, colours, acidulants, fillers, antioxidants, and other components that provide desired attributes.

The softeners, which are also known as plasticizers and plasticizing agents, generally constitute between approximately 0.5 to about 15% by weight of the chewing gum. The softeners may, in addition to including sucrose polyesters, include glycerin, lecithin, and combinations thereof. Aqueous sweetener solutions such as those containing sorbitol, hydrogenated starch hydrolysates, corn syrup and combinations thereof, may also be used as softeners and binding agents in chewing gum.

Bulk sweeteners include both sugar and sugarless components. Bulk sweeteners typically constitute 5 to about 95% by weight of the chewing gum, more typically constitute 20 to about 80% by weight, and more commonly, 30 to 60% by weight of the gum.

7

Sugar sweeteners generally include saccharide-containing components commonly known in the chewing gum art, but not limited to, sucrose, dextrose, maltose, dextrin, dried invert sugar, fructose, levulose, galactose, corn syrup solids, and the like, alone or in combination.

5

Sorbitol can be used as a sugarless sweetener. Additionally, sugarless sweeteners can include, but are not limited to, other sugar alcohols such as mannitol, xylitol, hydrogenated starch hydrolysates, maltitol, and the like, alone or in combination. High intensity artificial sweeteners can also be used in combination with the above.

- 10 Preferred sweeteners include, but are not limited to sucralose, aspartame, salts of acesulfame, alitame, saccharin and its salts, cyclamic acid and its salts, glycyrrhizin, dihydrochalcones, thaumatin, monellin, and the like, alone or in combination. In order to provide longer lasting sweetness and flavour perception, it may be desirable to encapsulate or otherwise control the release of at least a portion of the artificial
- 15 sweetener. Such techniques as wet granulation, wax granulation, spray drying, spray chilling, fluid bed coating, coacervation, and fiber extrusion may be used to achieve the desired release characteristics.

- Usage level of the artificial sweetener will vary greatly and will depend on such factors
- 20 as potency of the sweetener, rate of release, desired sweetness of the product, level and type of flavour used and cost considerations. Thus, the active level of artificial sweetener may vary from 0.02 to about 8%. When carriers used for encapsulation are included, the usage level of the encapsulated sweetener will be proportionately higher. Combinations of sugar and/or sugarless sweeteners may be used in chewing gum.
- 25 Additionally, the softener may also provide additional sweetness such as with aqueous sugar or alditol solutions.

If a low calorie gum is desired, a low caloric bulking agent can be used. Examples of low caloric bulking agents include polydextrose; Raftilose, Raftilin;

- 30 Fructooligosaccharides (NutraFlora); Palatinose oligosaccharide; Guar Gum Hydrolysate (Sun Fiber); or indigestible dextrin (Fibersol). However, other low calorie bulking agent can be used.

8

Any of the usual elastomers can be used in a quantity of typically 5-50 weight-%. The elastomer may be of natural origin, for instance such as stated in Food and Drug Administration, CFR, Title 21, Section 172.615, as "Masticatory Substances of Natural Vegetable Origin", or synthetic elastomers, such as styrene butadiene gum (SBR), butyl gum (isobutylene isoprene copolymer), or polyisobutylene (as stated in the above section of FDA under Masticatory Substances, Synthetic).

The inorganic fillers that form part of the chewing gum base includes calcium carbonate, talc, sodium sulphate, aluminium oxide, magnesium carbonate, kaolin, silicon oxide and calcium phosphates alone or in a mixture of more thereof. Waxes and fats are conventionally used for the adjustment of the consistency and softening of the chewing gum base when preparing chewing gum bases. In connection with the present invention any conventionally used and suitable type of wax may be used, such as for instance rice bran wax, polyethylene wax, petroleum wax (refined paraffin and micro crystalline wax), paraffin, beeswax, carnauba wax, candelilla wax, cocoa butter, degreased cocoa powder and any suitable oil or fat, as for instance completely or partially hydrogenated vegetable oils or completely or partially hydrogenated animal fats. In a preferred embodiment, the chewing gum is wax free. The wax of the general formulations may be replaced with hydrogenated oil or fat.

To soften the gum base further and to provide it with water binding properties, which gives the gum bases a pleasant smooth surface and reduces its adhesive properties, one or more emulsifiers may usually be added. Mono and diglycerides of edible fatty acids, lactic acid esters and acetic acid esters of mono and diglycerides of edible fatty acids, acetylated mono and diglycerides, sugar esters of edible fatty acids, Na-, K-, Mg- and Ca-stearates, lecithin, hydroxylated lecithin and the like may be mentioned as examples of legal and conventionally used emulsifiers added to the chewing gum base. In case of the presence of an active ingredient, the formulation may comprise certain specific emulsifiers and/or solubilizers in order to disperse and release the active ingredient.

Emulsifiers are conventionally used in quantities of 0-18 weight-%, preferably 0-12 weight-% of the gum base. Furthermore, the chewing gum base may optionally contain the usual additives, such as antioxidants, for instance BHT, BHA, propylgallate and tocopherols as well as preservatives and colorants.

Resins should also be mentioned as a component forming part of a chewing gum base, said resins being used to obtain the right chewing consistency and as plasticizer for the elastomers of the chewing gum base.

- 5 The chewing gum may also comprise the following surfactants and/or solubilizers, especially when active ingredients are present. As examples of types of surfactants to be used as solubilizers in a chewing gum composition according to the invention reference is made to H.P. Fiedler, Lexikon der Hilfstoffe für Pharmacie, Kosmetik und Angrenzende Gebiete, page 63-64 (1981) and the lists of approved food emulsifiers of
10 the individual countries.

- Both anionic, cationic, amphoteric, and nonionic solubilizers can be used, but usually the solubilizer used is either anionic or nonionic as mainly such solubilizers are approved for use in food or medicines. In cases where the active agent is reactive it is
15 usually an advantage to use a nonionic solubilizer as such are not very reactive and therefore do not affect the stability of the active agent unfavourably.

- Suitable solubilizers include lecithines, polyoxyethylene stearate, polyoxyethylene sorbitan fatty acid esters, fatty acid salts, mono and diacetyl tartaric acid esters of
20 mono and diglycerides of edible fatty acids, citric acid esters of mono and diglycerides of edible fatty acids, saccharose esters of fatty acids, polyglycerol esters of fatty acids, polyglycerol esters of interesterified castor oil acid (E476), sodium stearoyllatylate, sodium lauryl sulfate and sorbitan esters of fatty acids, which solubilizers are all known for use as food emulsifiers, and polyoxyethylated hydrogenated
25 castor oil (for instance such sold under the trade name CREMOPHOR), blockcopolymers of ethylene oxide and propylene oxide (for instance as sold under the trade name PLURONIC or the trade name POLOXAMER), polyoxyethylene fatty alcohol ethers, polyoxyethylene sorbitan fatty acid esters, sorbitan esters of fatty acids and polyoxyethylene stearic acid ester, all known in the EEC for use as pharmaceutical-
30 cosmetical emulsifiers.

- Particularly suitable solubilizers are polyoxyethylene stearates, such as for instance polyoxyethylene(8)stearate and polyoxyethylene(40)stearate, the polyoxyethylene sorbitan fatty acid esters sold under the trade name TWEEN, for instance TWEEN 20
35 (monolaurate), TWEEN 80 (monooleate), TWEEN 40 (monopalmitate), TWEEN 60 (monostearate) or TWEEN 65 (tristearate), mono and diacetyl tartaric acid esters of mono and diglycerides of edible fatty acids, citric acid esters of mono and diglycerides

10

of edible fatty acids, sodium stearoyllatylate, sodium laurylsulfate, polyoxyethylated hydrogenated castor oil, blockcopolymers of ethylene oxide and propyleneoxide and polyoxyethylene fatty alcohol ether. The solubilizer may either be a single compound or a combination of several compounds. The expression "solubilizer" is used in the present text to describe both possibilities, the solubilizer used must be suitable for use in food and/or medicine.

In the presence of an active ingredient the chewing gum may preferably also comprise a carrier known in the art.

10

In a further embodiment according to the invention the chewing gum also comprise a fatty acid sucrose ester such as palmitate/stearate sucrose ester. The palmitate/stearate sucrose ester may enhance the flavour release and/or increase release of an active ingredient. Preferably, the content of palmitate of the sucrose ester is above 50% of the weight of fatty acids of the sucrose ester.

Examples of active agents in the form of compounds for the care or treatment of the oral cavity and the teeth, are for instance bound hydrogen peroxide and compounds capable of releasing urea during chewing.

20

Examples of active agents in the form of antiseptics are for instance salts and compounds of guanidine and biguanidine (for instance chlorhexidine diacetate) and the following types of substances with limited water-solubility: quaternary ammonium compounds (for instance ceramium, chloroxylenol, crystal violet, chloramine), aldehydes (for instance paraformaldehyde), compounds of dequaline, polynoxyline, phenols (for instance thymol, para chlorophenol, cresol) hexachlorophene, salicylic anilide compounds, triclosan, halogenes (iodine, iodophores, chloroamine, dichlorocyanuric acid salts), alcohols (3,4 dichlorobenzyl alcohol, benzyl alcohol, phenoxyethanol, phenylethanol), cf. furthermore Martindale, The Extra Pharmacopoeia, 28th edition, page 547-578; metal salts, complexes and compounds with limited water-solubility, such as aluminium salts, (for instance aluminium potassium sulfate $AlK(SO_4)_2 \cdot 12H_2O$) and furthermore salts, complexes and compounds of boron, barium, strontium, iron, calcium, zinc, (zinc acetate, zinc chloride, zinc gluconate), copper (copper chloride, copper sulfate), lead, silver, magnesium, sodium, potassium, lithium, molybdenum, vanadium should be included; other compositions for the care of mouth and teeth: for instance; salts, complexes and

compounds containing fluorine (such as sodium fluorid , sodiummonofluorophosphate, aminofluorides, stannous fluoride), phosphates, carbonates and selenium.

Confer furthermore J. Dent.Res. Vol. 28 No. 2, page 160-171, 1949, wherein a wide
5 range of tested compounds are mentioned.

Examples of active agents in the form of agents adjusting the pH in the oral cavity
include for instance: acceptable acids, such as adipic acid, succinic acid, fumaric
acid, or salts thereof or salts of citric acid, tartaric acid, malic acid, acetic acid, lactic
10 acid, phosphoric acid and glutaric acid and acceptable bases, such as carbonates,
hydrogen carbonates, phosphates, sulfates or oxides of sodium, potassium,
ammonium, magnesium or calcium, especially magnesium and calcium.

Examples of active agents in the form of anti-smoking agents include for instance:
15 nicotine, tobacco powder or silver salts, for instance silver acetate, silver carbonate
and silver nitrate.

Other active ingredients include beta-lupeol, Letigen®, sildenafil citrate and derivatives
thereof.

20

In one embodiment, where the preparation according to the invention comprises an
active ingredient, up to 50 weight-%, preferably 0.1-10 weight-% active agent may
be in the form of a solid dispersion hereof in a carrier, up to 60 weight-%, preferably
approximately 20 weight-% of the carrier used to obtain the solid dispersion, 0.1-30
25 weight-%, preferably 0.1-10 weight-% solubilizer, 15-80 weight-%, preferably
approximately 35 weight-% chewing gum base and up to 85 weight-%, preferably
approximately 35 weight-% auxiliary substances and additives.

The invention further relates to a process for the preparation of a chewing gum
30 composition, which process is characterised by preparing a chewing gum base on the
basis of conventional chewing gum base constituents.

The formulation of the chewing gum base depends on the type of chewing gum
desired as described above or the required type of structure. Suitable raw materials for
35 the gum base comprise substances according to U.S. Chewing Gum Base Regulations
- Code of Federal Regulations, Title 21, Section 172.615.

12

It is a particular advantage of the invention that the chewing gum composition can be prepared using conventional ingredients, conventional equipment and conventional methods of preparation.

- 5 The chewing gum product may be of any known type, such as bubble gum, bits, optionally provided with a dragée, and sticks or chewing gum of any other desired form. The chewing gum pieces may be coated with a type of wax, a film coating or a conventional so-called candy coat based on sugar-containing or sugar free substances.
- 10 A single piece of chewing gum usually weighs between 0.4 and 20.0 g. The following Table indicates the preferred intervals for the different product types:

Chewing gum bits	500-3,500 mg
Coated chewing gum	600-6,000 mg
15 Chewing gum sticks	1,000-5,000 mg

- When the individual ingredients forming part of a chewing gum composition according to the invention are mentioned in singular, such mention also comprises a combination of several such ingredients, apart from instances where one particular ingredient is
- 20 mentioned.

The invention is illustrated in more details below by means of the Examples, which are not limiting for the present invention.

25 Examples of chewing gum bases

Preparation of a chewing gum base suitable for an ordinary chewing gum:

Synthetic elastomer	15%
PVA	22%
30 Elastomer plasticizer	26%
Sucrose ester	3%
Filler	14%
Softeners	20%

- 35 Preparation of a chewing gum base suitable for a chewing gum comprising an active ingredient:

Elastomers	4 weight-%
------------	------------

13

Terpene resin	28 weight-%
Low molecular weight PVA	29 weight-%
Emulsifier	6 weight-%
Sucrose ester	2 weight-%
5 Waxes	31 weight-%

The elastomer is ground in a conventional mixer for the preparation of chewing gum and gum base while being heated to 110-130°C and terpene resin and low molecular weight PVA are added slowly in small portions. Finally waxes and emulsifier are
10 added. To ensure a homogenous base it is important that all the ingredients are added in small portions and that the subsequent portions are not added until the preceding portion is ground.

15 Preparation of Chewing Gum

Examples of a chewing gum prepared according to the present invention:

Basic Formulation 1 comprising an active ingredient.

20	Gum base	35 weight-%
	Sorbitol powder	10 weight-%
	Hydrogenated glucose syrup	10 weight-%
	Active agent if desired	0.01-30 weight-%
25	Solubilizer	0-20 weight-%
	Optional flavour	1.9 weight-%
	Optional additional sorbitol powder q.s.	100 weight-%

The chewing gum pieces are prepared in the manner conventional for the preparation
30 of chewing gum and using a conventional apparatus for the preparation of chewing gum.

The chewing gum base is melted or ground in a conventional chewing gum mixer. When the chewing gum base is homogenous, the other ingredients are admixed one
35 by one in the order mentioned. A possible active agent may be admixed separately or in the form of a pre-mixture or in a solution. Depending on the state of the ingredients and their melting point, such pre-mixture may be a simple mixture of two or more

14

powders, a mixture of one or more powders in one or more liquids or a mixture of more liquids at ordinary, increased or lower temperature. To ensure a good dispersion of the ingredients it may, especially when adding very small quantities of one or more of the components of the pre-mixture, be an advantage to add these as a liquid mixture or a solution where this is possible.

Examples of chewing gum comprising dried fruit powder

10 Example 1

Sugar-containing chewing gum (standard without fruit powder)

	%
Sugar	62.7
15 Gum base	25
Glucose syrup	9
Citric acid	1
Sorbitol liquid 70%	1
Black current flavour	0.9
20 Lecithin	0.3
Triacetin	0.1

Example 2

25

Sugar-containing chewing gum (with fruit powder and flavour)

	%
Sugar	58.5
Gum base	25
30 Glucose syrup	10
Black current powder *	3
Citric acid	0.9
Sorbitol liquid 70%	1.5
Black current flavour	0.4

15

Triacetin	0.4
-----------	-----

Lecithin	0.3
----------	-----

* freeze-dried black current

5 Example 3

Sugar-containing chewing gum (with fruit powder only)

%

Sugar	55.1
-------	------

10 Gum base	25
-------------	----

Glucose syrup	11
---------------	----

Black current powder *	5
------------------------	---

Sorbitol liquid 70%	2
---------------------	---

Citric acid	0.8
-------------	-----

15 Tracetin	0.8
-------------	-----

Lecithin	0.3
----------	-----

* freeze-dried black current

Example 4

20

Sugar-containing bubble gum (with fruit powder and flavour)

%

Sugar	39.2
-------	------

Bubble Gum Base	21
-----------------	----

25 Dextrose	19
-------------	----

Glucose syrup	15
---------------	----

Strawberry powder *	3
---------------------	---

Sorbitol liquid 70%	1
---------------------	---

Citric acid	0.8
-------------	-----

30 Strawberry flavour	0.4
-----------------------	-----

Triacetin	0.4
-----------	-----

Lecithin	0.2
----------	-----

* freeze-dried strawberry

16

Exempl 5**Sugar-containing Bubble Gum (with fruit powder)**

	%
5 Sugar	35.7
Bubble Gum Base	21
Dextrose	19
Glucose syrup	16
Strawberry powder *	5
10 Sorbitol liquid 70%	1.5
Citric acid	0.8
Triacetin	0.8
Lecithin	0.2

* 50% freeze-dried and 50% tumble dried strawberry

15

Example 6**Sugar free chewing gum (standard with fruit flavour)**

	%
20 Sorbitol powder	45.6
Gum base	38
Xylitol	7
Maltitol (syrup)	5
Raspberry flavour	2
25 Citric acid	1
Malic acid	0.6
Aspartame	0.5
Lecithin	0.3

30 Example 7**Sugar free chewing gum (with fruit powder and flavour)**

	%
Sorbitol powder	41.7

17

	Gum base	38
	Xylitol	7
	Maltitol (syrup)	6
	Raspberry powder *	3
5	Raspberry flavour	1
	Citric acid	1
	Triacetin	0.9
	Malic acid	0.6
	Aspartame	0.5
10	Lecithin	0.3
	* freeze-dried raspberry	

Example 8**15 Sugar free chewing gum (with fruit powder only)**

		%
	Sorbitol powder	37.8
	Gum base	38
	Xylitol	7
20	Maltitol (syrup)	7
	Raspberry powder *	6
	Triacetin	1.8
	Citric acid	1
	Malic acid	0.6
25	Aspartame	0.5
	Lecithin	0.3
	* freeze-dried raspberry	

30 Example 9**Sugar free Bubble Gum (with fruit powder and flavour)**

	%
Sorbitol	54.3

18

	Bubble Gum Base	26
	Sorbitol liquid 70%	10
	Mannitol	4
	Orange powder *	2
5	Lemon powder **	1
	Lecithin	1
	Glycerol	0.8
	Citric acid	0.5
	Malic acid	0.5
10	Orange Flavour	0.5
	Lemon Flavour	0.3
	Saccharin	0.1
	* spray dried orange juice	
	** freeze-dried lemon	

15

Example 10

Sugar free Bubble Gum (with fruit powder)

		%
20	Sorbitol	51.1
	Bubble Gum Base	26
	Sorbitol liquid 70%	10
	Mannitol	4
	Orange powder *	4
25	Lemon powder **	2
	Lecithin	1
	Glycerol	0.8
	Citric acid	0.5
	Malic acid	0.5
30	Saccharin	0.1

* spray dried orange juice

** freeze-dried lemon

19

Examples of coating of chewing gum by use of fruit preparations

Coated chewing gum is prepared by coating a chewing gum core with a number of coating layers. The coating most frequently takes place in rotating coating kettles in which chewing gum cores are put in motion and coating suspension is added in small doses that are dispersed evenly on the surfaces of the cores. Subsequently, the coated cores are dried by means of air. These coating operations can be made up to 90 times until a desired coating thickness is obtained.

- 10 The coating suspension is often an aqueous solution of a sugar or the like applied at a high temperature in order to facilitate the coating process. To give a quick flavour release one or more flavouring agents according to the present invention may be applied to the chewing gum between the application of the coating suspension.

15 Example A**Sugar-containing coating**

	%
Syrup (70%)	91
20 Black current *	3
Water	4.7
Gelatine	0.8
Black current flavour **	0.5
* Black current freeze-dried is blended with sugar suspension and is added in	
25	few or more applications
** Black current flavour is added in between the applications of coating suspension	

Example B

30

Sugar-containing coating (with fruit concentrate)

	%
Syrup (70%)	88.5
Black current concentrate Brix 65.3 *	3

20

Black current freeze-dried**	3
Water	4.7
Gelatine	0.8

- 5 * Black current concentrate is blended with sugar suspension and is added in few or more applications
- ** The freeze-dried black current powder is also blended with the sugar suspension.

Example C

10

Sugar free sorbitol coating (with fruit powder and flavour)

	%
Sorbitol liquld/neosorb 70/02	97
Water	1.5
15 Strawberry powder *	1
Strawberry flavour **	0.5
* The cores are sprinkled with strawberry powder in between the applications of sorbitol suspension	
** Strawberry flavour is dosed in between the applications of the sorbitol suspension	

20

Example D

Sugar free xylitol coating (with fruit powder)

25	%
Xylitol	64.9
Water	31.5
Gelatine	1.6
Strawberry powder *	2
30	* in between the applications of xylitol suspension the cores are sprinkled with strawberry powder (freeze-dried)

The following test profiles demonstrates the surprising effect with respect to taste which is obtained by use of the natural flavouring agent according to the invention.

21

Test profile 1**Products:****5 1. 5573-23 standard**

Comprising 2 % strawberry flavour (Wild Strawberry commercially available from the Silesia) by weight of chewing gum formulation. Dragee/coating 1.08 % strawberry flavour.

10 2. 5553-21 test product

Natural vegetable flavouring agent: 1.5 % Strawberry (freeze-dried powder) , 1.5 % Raspberry (freeze-dried powder) by weight of chewing gum formulation; dragee 0.5% strawberry freeze-dried powder)

15 (water content of freeze-dried powder 2-6%)**Assessors:**

8 persons

20**Time consumption:**

1 hour an assessor + time of the head of panel = 18 hours.

Procedure:

25 This sensory analysis is tested in DANDY's Sensory Laboratory, which consists of 10 individual tasting booths according to ISO 8589. The products are served at room temperature in 40 ml tasteless plastic cups coded with a randomised three-figure number.

30 The products are tested at the following intervals:

Initial phase : 0-1 min.

Intermediate phase 1: 1-2 min.

Intermediate phase 2: 3-4 min.

End phase : 5-6 min.

There is a three-minute interval between every product being tasted. Every test is repeated. The FIZZ (French Bio System) was used to collect and calculate data.

	Initial Phase	
	Significance clear	Significance diverse
Initial softness	**	**
Flavour impact	NS	NS
Flavour intensity	NS	NS
Juicy	NS	NS
Sourness	NS	NS
Sweetness	NS	NS
Strawberry center	***	(7.2) *
Perfumed	***	(24.0) **
Synthetic	***	(36.1) ***
Strawberry	***	(38.7) ***
Forest fruit	***	***
Astringent	*	*
Creaky	NS	NS
Volume	NS	NS

5

	Intermediate Phase I	
	Significance clear	Significance diverse
Softness	*	*
Flavour intensity	NS	NS
Juicy	*	(2,2) NS
Sourness	NS	NS
Sweetness	NS	NS
Strawberry center	***	***
Perfumed	***	(26.4) **
Synthetic	***	***
Strawberry	***	(27.3) **

23

Forest fruit	***	(23.1) **
Astringent	***	***
Creaky	**	(4.3) NS
Volume	NS	NS

	Intermediate Phase II	
	Significance clear	Significance diverse
Softness	**	(3.0)
Flavour intensity	NS	NS
Julcy	**	(3,2) NS
Sourness	NS	NS
Sweetness	NS	NS
Strawberry center	***	(22.2) **
Perfumed	***	(19.9) **
Synthetic	***	(20.7) **
Strawberry	***	(19.7) **
Forest fruit	***	***
Astringent	**	**
Creaky	***	(4.2) NS
Volume	NS	NS

Conclusion:

- 5 The difference between the two products is mainly found in the attributes: strawberry center, perfumed, synthetic, strawberry, forest fruit and astringent.

The sample 5553-21 is found as being significantly less perfumed, synthetic and astringent than the standard 5573-23P.

10

The standard 5573-23P has significantly less strawberry centers, less strawberry flavour but more forest fruit flavour than the sample 5553-21.

24

In the end phase the sample 5553-21 is being judged as significantly higher in flavour intensity than the sample.

In the initial phase, the standard is significantly softer than 5553-21. This is also the case during the initial phase I, but not in the rest of the profile, where the two products are similar concerning the texture.

Test profile 2

10 Products:

1. 5553-46 standard

Comprising 0.6% raspberry flavour, 0.6% orange flavour, 0.9% strawberry on the chewing gum formulation, 0.5% raspberry flavour in the dragee/coatning.

15 2. 5553-42 test product

Comprising 1% raspberry, 1% orange, 1% strawberry freeze-dried powders.
2% raspberry powder freeze-dried in the dragee/coatning

Assessors:

20 10 persons

Time consumption:

1 hour an assessor + time of the head of panel = 18 hours.

25 Procedure:

As for test profile 1

	Initial Phase	
	Significance clear	Significance diverse
Initial softness	*	*
Flavour impact	***	(3.1) NS
Flavour intensity	NS	NS
Juicy	NS	NS

25

Sourness	**	**
Sweetness	NS	NS
Synthetic	***	(35.9) ***
Red fruit	***	(8.5) *
Orange fruit	***	(4.2) NS
Softness	***	***
Astringent	*	*
Creaky	NS	NS
Volume	NS	NS

	Intermediate Phase I	
	Significance clear	Significance diverse
Softness	***	***
Flavour intensity	**	**
Juicy	***	***
Sourness	NS	NS
Sweetness	NS	NS
Synthetic	***	(25.4) ***
Red fruit	***	(7.8) *
Orange fruit	***	(3.8) NS
Softness	**	**
Astringent	**	**
Creaky	***	(3.3) NS
Volume	**	**

5

	Intermediate Phase II	
	Significance clear	Significance diverse
Softness	**	(2.8) NS
Flavour intensity	*	*
Juicy	*	*

26

Sourness	NS	NS
Sweetness	NS	NS
Synthetic	***	***
Red fruit	***	***
Orange fruit	**	(3.2) NS
Softness	**	(4.5) NS
Astringent	**	**
Creaky	***	(4.7) NS
Volume	**	**

	End Phase	
	Significance clear	Significance diverse
Softness	NS	NS
Flavour Intensity	NS	NS
Juicy	*	(2.5) NS
Sourness	NS	NS
Sweetness	NS	NS
Synthetic	***	(20.6) **
Red fruit	***	***
Orange fruit	**	(2.3) NS
Softness	***	(3.4) NS
Astringent	NS	NS
Creaky	**	(2.0) NS
Volume	***	(6.4) *

Conclusion:

5 In the beginning of the profile the standard is significantly softer than the trial.

All through the profile, the standard is judged as being significantly more synthetic than the trial, and significantly less red fruit than the trial 5553-42.

The standard is also more astringent in three of the four phases than the trial, and in 10 the three last phases the trial is significantly bigger in volume than the standard.

In the two intermediate phases the trial 5553-42 is significantly more juicy and has a higher flavour intensity than the standard.

5 Test profile 3

Products:

1. 5553-45 standard

Comprising 0.7% lemon, 1.2% orange and 0.10% pink grape flavours in the chewing
10 gum formulation and in the coating/drage 0.1% lemon, 0.2% orange, 0.05% pink
grape flavours.

2. 5553-38 test product

15 Comprising 0.7% orange flavour and 0.1% pink grape in the chewing gum formulation
and 0.7% freeze-dried orange powder.

Assessors:

10 persons

20

Time consumption:

1 hour an assessor + time of the head of panel = 18 hours

Procedure:

25 As for test profile 1

	Initial Phase	
	Significance clear	Significance diverse
Initial softness	***	***
Flavour impact	***	***
Flavour intensity	**	(3.3) NS
Juicy	NS	NS
Sourness	NS	NS

28

Sweetness	NS	NS
Citrus	**	**
Synthetic	NS	NS
Softness	***	(72.8) ***
Cheesiness	***	(50.3) ***
Astringent	NS	NS
Creaky	NS	NS
Volume	***	***

	Intermediate Phase I	
	Significance clear	Significance diverse
Softness	***	***
Flavour intensity	NS	NS
Juicy	NS	NS
Sourness	***	(4.6) NS
Sweetness	**	**
Citrus	NS	NS
Synthetic	NS	NS
Softness	***	***
Cheesiness	***	***
Astringent	NS	NS
Creaky	NS	NS
Volume	***	(17.4) **

	Intermediate Phase II	
	Significance clear	Significance diverse
Softness	***	***
Flavour intensity	*	(3.0) NS
Juicy	NS	NS
Sourness	**	**
Sweetness	NS	NS

29

Citrus	NS	NS
Synthetic	NS	NS
Softness	***	***
Cheesiness	***	***
Astringent	NS	NS
Creaky	*	(0.7) NS
Volume	***	(12.8) **

	End Phase	
	Significance clear	Significance diverse
Softness	***	***
Flavour intensity	NS	
Juicy	NS	
Sourness	*	*
Sweetness	NS	
Citrus	NS	
Synthetic	NS	
Softness	***	***
Cheesiness	***	(17.3) **
Astringent	NS	NS
Creaky	**	(1.2) NS
Volume	***	(24.5) ***

Conclusion:

5

Concerning the texture, the standard in all four phases is significantly softer and more cheesy than the trial. It is known that a softer product release the taste faster than a harder product. Accordingly, the chosen standard formulation is more likely to release the flavour in the initial phase corresponding to the finding that the test in the end

10 phase demonstrate increased impact, flavour intensity, sourness and a juicy taste. Sourness is an indicator of freshness. Despite the harder product, the decreased

30

synthetic taste clearly seen in test profil 1 and 2, is also indicated in the present profile ven though it is only in the coating that the natural lemon powder is present.

CLAIMS

1. A chewing gum formulation comprising
- 5 a) an insoluble gum base;
b) a water soluble portion;
c) a flavouring agent wherein at least 5 % by weight of the flavouring agent is a natural vegetable flavouring agent.
- 10 2. A chewing gum formulation according to claim 1 wherein at least 35 % by weight such as at least 50%, preferable at least 60%, more preferred at least 70% by weight of the flavouring agent is a natural vegetable flavouring agent.
3. A chewing gum formulation according to claim 1 wherein at least 75 % by weight such as at least 80%, preferable at least 85%, more preferred at least 90% by
- 15 weight of the flavouring agent is a natural vegetable flavouring agent.
4. A chewing gum formulation according to claim 1 wherein at least 95 % by weight such as at least 98%, preferable about 100% by weight of the flavouring agent is a natural vegetable flavouring agent.
- 20 5. A chewing gum formulation according to any of the preceding claims wherein the natural vegetable flavouring agent is selected from fruit and herbs
6. A chewing gum formulation according to any of claims 1- 5 wherein the natural
- 25 vegetable flavouring agent is the is selected from coconut, grape fruit, orange, lime, lemon, mandarin, pineapple, strawberry, raspberry, mango, passionfruit, kiwi, apple, pear, peach, strawberry, apricot, raspberry, cherry, pineapple, grapes, banana, cranberry, blueberry, blackcurrent, redcurrent, gooseberry, and lingonberries, thyme, basil, camille, valerian, fennel, parsly, camomille, tarragon, lavender, dild, cumin,
- 30 bargamot, salvie, aloe vera balsam, spearmint, peppermint, eucalyptus and mixtures thereof.
7. A chewing gum formulation according to any of the preceding claim wherein the natural flavouring agent is dried.

8. A chewing gum formulation according to claim 7 wherein the water content of the natural flavouring agent is less than 75% by weight, such as less than 60%, preferable less than 40%, more preferred less than 30%, such as less than 25%.

5

9. A chewing gum formulation according to claim 7 wherein the water content of the natural flavouring agent is less than 20% by weight, such as less than 15%, more preferred less than 10% such as between 1.5-7%, most preferred between 2-6%.

10 10. A chewing gum formulation according to any of the preceding claims wherein the natural flavouring agent is freeze-dried.

11. A chewing gum formulation according to any of the preceding claims wherein the natural flavouring agent is in the form of a powder, slices or pieces or combinations thereof.

15

12. A chewing gum formulation according to claim 11 wherein the natural flavouring agent is in a form where the particle size is less than 3 mm, such as less than 2 mm, more preferred less than 1 mm, calculated as the longest dimension of the particle.

20

13. A chewing gum formulation according to claim 11 wherein the natural flavouring agent is in a form where the particle size is from about 3 μ to 2 mm, such as from 4 μ to 1 mm.

25 14. A chewing gum formulation according to any of the preceding claims wherein the natural flavouring agent comprises seeds from a fruit e.g. from strawberry, blackberry and raspberry, and which seeds are substantially intact.

15. A chewing gum formulation according to any of the preceding claims wherein the natural vegetable flavouring agent also provides the gum formulation with natural colour.

30

16. A chewing gum formulation according to any of the preceding claims wherein the natural flavouring agent is used in the coating of the gum formulation.

17. A chewing gum formulation according to claim 16 wherein the natural flavouring agent provides natural colour to the coating.
- 5 18. A chewing gum formulation according to any of the preceding claims wherein the natural flavouring agent is used in an amount from about 1% to 30% by weight, such as about 5% to 20% by weight of the total weight of the formulation.
20. A chewing gum formulation according to any of the preceding claims comprising
10 from 5% to 85% by weight of a gum base material.
21. A chewing gum formulation according to any of the preceding claims comprising one or more of the following;
at least one softener; a bulk sweetener; a high intensity sweetener; an emulsifier; an
15 elastomer plasticizer; an elastomer; a mono-diglyceride; a sucrose fatty acid ester.
22. A method for preparing a chewing gum composition comprising providing a mixture of
a) an insoluble gum base;
20 b) a water soluble portion;
c) a flavouring agent wherein at least 5 % by weight of the flavouring agent is a natural vegetable flavouring agent.
23. A method according to claim 22 wherein at least 10 % by weight such as at least
25 20%, preferable at least 30%, more preferred at least 40% by weight, such as about 50% of the flavouring agent is a natural vegetable flavouring agent.
24. A method according to any of claims 22 and 23 wherein at least 50 % by weight such as at least 60%, preferable at least 70%, more preferred at least 80% by weight
30 of the flavouring agent is a natural vegetable flavouring agent.
25. A method according to any of claims 22 to 24 wherein at least 85 % by weight such as at least 90%, preferable at least 95%, still more preferred at least 98% such

as about 100% by weight of the flavouring agent is a natural vegetable flavouring agent.

26. A method according to any of claims 22 to 25 wherein the natural vegetable
5 flavouring agent is selected from fruits and herbs.

27. A method according to claim any of claims 1-26 wherein the natural vegetable
flavouring agent is the is selected from coconut, grape fruit, orange, lime, lemon,
mandarin, pineapple, strawberry, raspberry, mango, passionfruit, kiwi, apple, pear,
10 peach, strawberry, apricot, raspberry, cherry, pineapple, grapes, banana, cranberry,
blueberry, blackcurrent, redcurrent, gooseberry, and lingonberries, thyme, basil,
camille, valerian, fennel, parsly, camomille, tarragon, lavender, dild, cumin, bargamot,
salvie, aloe vera balsam, spearmint, peppermint, eucalyptus and mixtures thereof.

15 28. A method according to any of claims 22 to 27 wherein the natural flavouring
agent is dried.

29. A method according to any of claims 22 to 28 wherein the water content of the
natural flavouring agent is less than 75% by weight, such as less than 60%,
20 preferable less than 40%, more preferred less than 30%, such as less than 25%.

30. A method according to any of claims 22 to 29 wherein the water content of the
natural flavouring agent is less than 20% by weight, such as less than 15%, more
preferred less than 10% such as between 1.5-7%, most preferred between 2-6%.
25

31. A method according to any of claims 22 to 30 wherein the natural flavouring
agent is freeze-dried.

32. A method according to any of claims 22 to 31 wherein the natural flavouring
30 agent is in the form of a powder, slices or pieces or combinations thereof.

33. A method according to claim 32 wherein the natural flavouring agent is in a form
where the particle size is less than 3 mm, such as less than 2 mm, more preferred less
than 1 mm, calculated as the longest dimension of the particle.

34. A method according to any of claims wherein the natural flavouring agent is in a form where the particle size is from about 3μ to 2 mm, such as from 4μ to 1 mm.
- 5 35. A method according to any of claims 22 to 34 wherein the natural flavouring agent comprises seeds from a fruit e.g. from strawberry, blackberry and raspberry, and which seeds are substantially intact.
36. A method according to any of claims 22 to 35 wherein the natural vegetable
10 flavouring agent also provides the gum formulation with natural colour.
37. A method according to any of claims 22 to wherein the natural flavouring agent is used in the coating of the gum formulation.
- 15 38. A method according to any of claims 22 to 37 wherein the natural flavouring agent provides natural colour to the coating.
39. A method according to any of claims 22 to 38 wherein the natural flavouring agent is used in an amount from about 1% to 30% by weight, such as about 5% to
20 20% by weight of the total weight of the formulation.
40. A method according to any of claims 22 to 39 wherein the gum base material constitutes from 5% to 85% by weight of the chewing gum formulation.
- 25 41. A method according to any of claims 22 to 40 comprising adding one or more of the following ingredients to the formulation:
at least one softener; a bulk sweetener; a high intensity sweetener; an emulsifier; an elastomer plasticizer; an elastomer; a mono-diglyceride; a sucrose fatty acid ester.
- 30 42. Use of a natural vegetable component as flavouring agent in a chewing gum formulation as described in any of claims 1-21.
43. Use according to claim 42 wherein the natural vegetable component comprises cellular material of the natural component.

36

44. Use according to claim 43 wherein the cellular material comprises substantial intact cellular components.

5

Modtaget PD

23 NOV, 1998

1/12

File : pr88013.frs	
Computation of the statistics	
Global	
5573-23P STD	
Mean	
5553-21	
Mean	

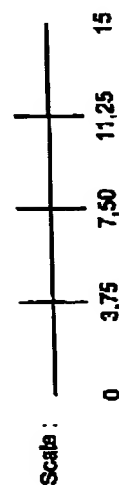
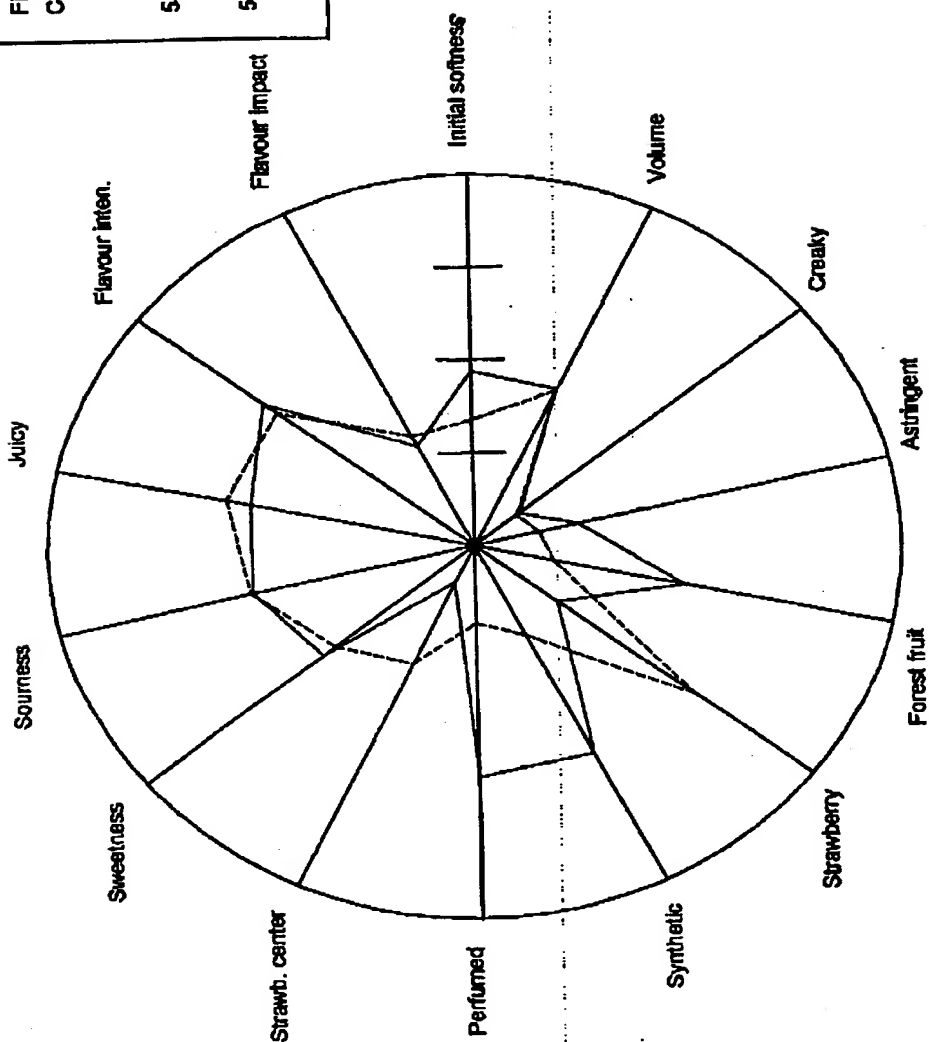


Fig. 1

23 NOV. 1998

2/12

File : pr98013.fs
 Computation of the statistics
 Global
 5573-23P STD
 Mean
 5553-21
 Mean

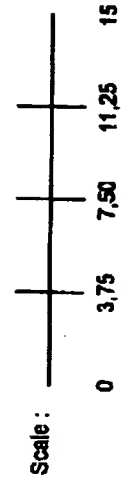
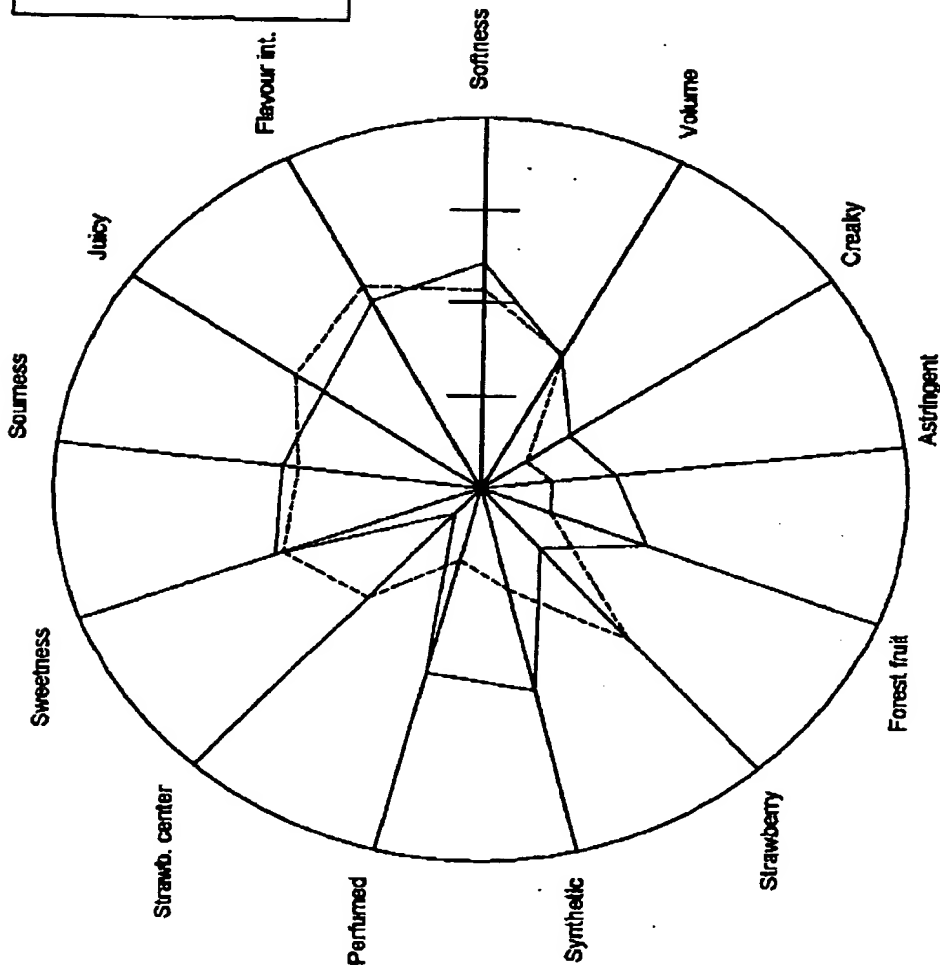


Fig. 2

3/12

Modtaget PD

23 NOV. 1998

File : pr98013.frs
 Computation of the statistics
 Global
 5573-23P STD
 Mean
 5553-21
 Mean

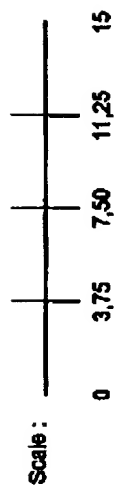
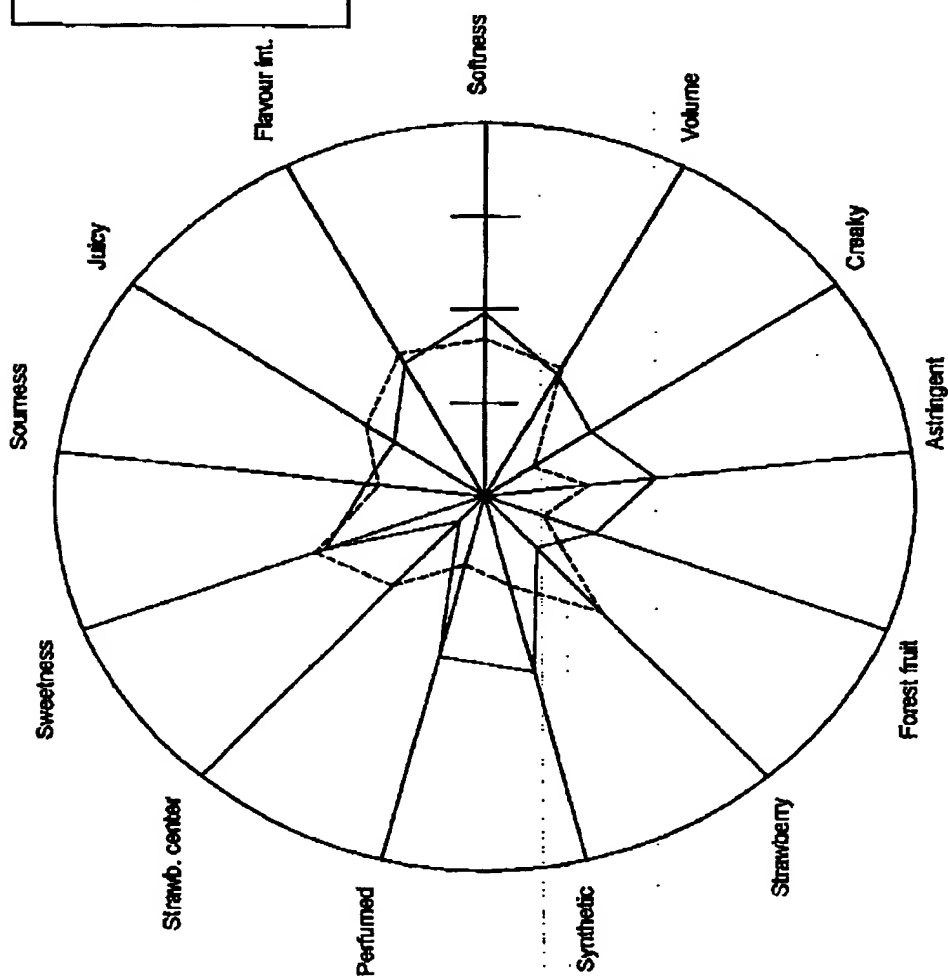


Fig. 3

4/12

Modtaget PD

23 NOV. 1998

File : pr88013.frs
 Computation of the statistics
 Global
 5573-23P STD
 Mean
 5553-21
 Mean

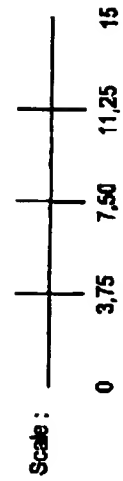
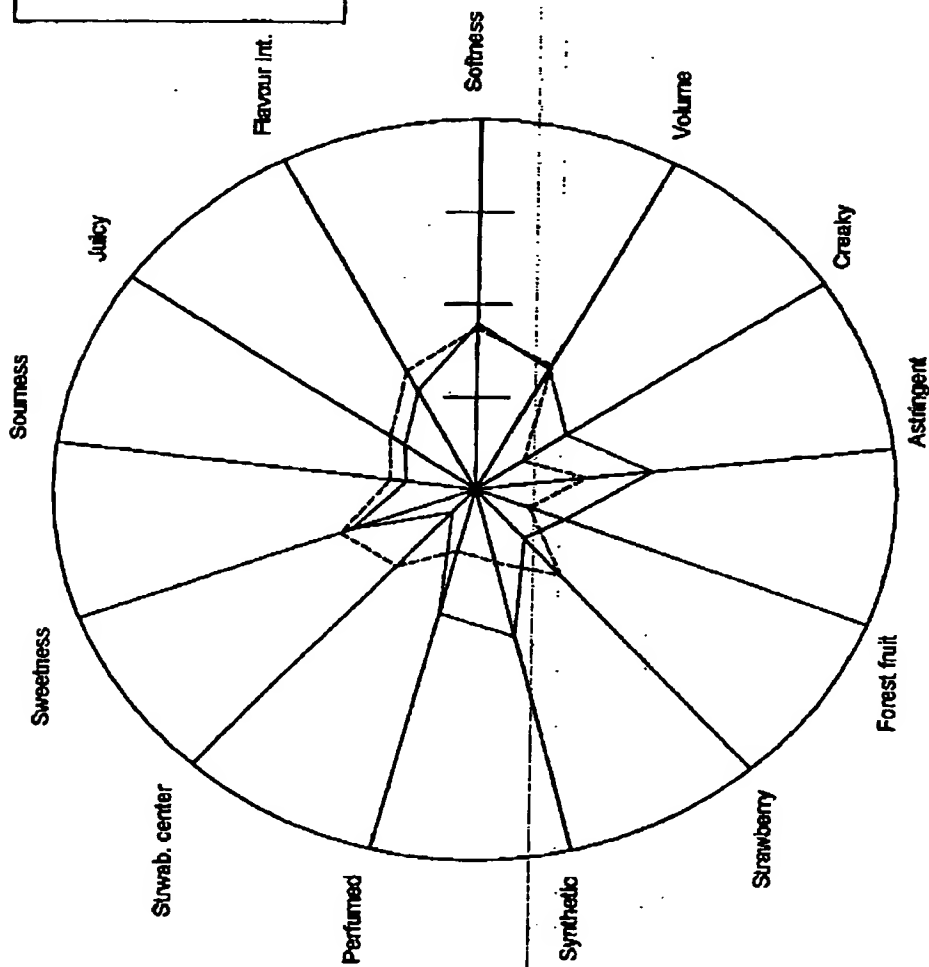
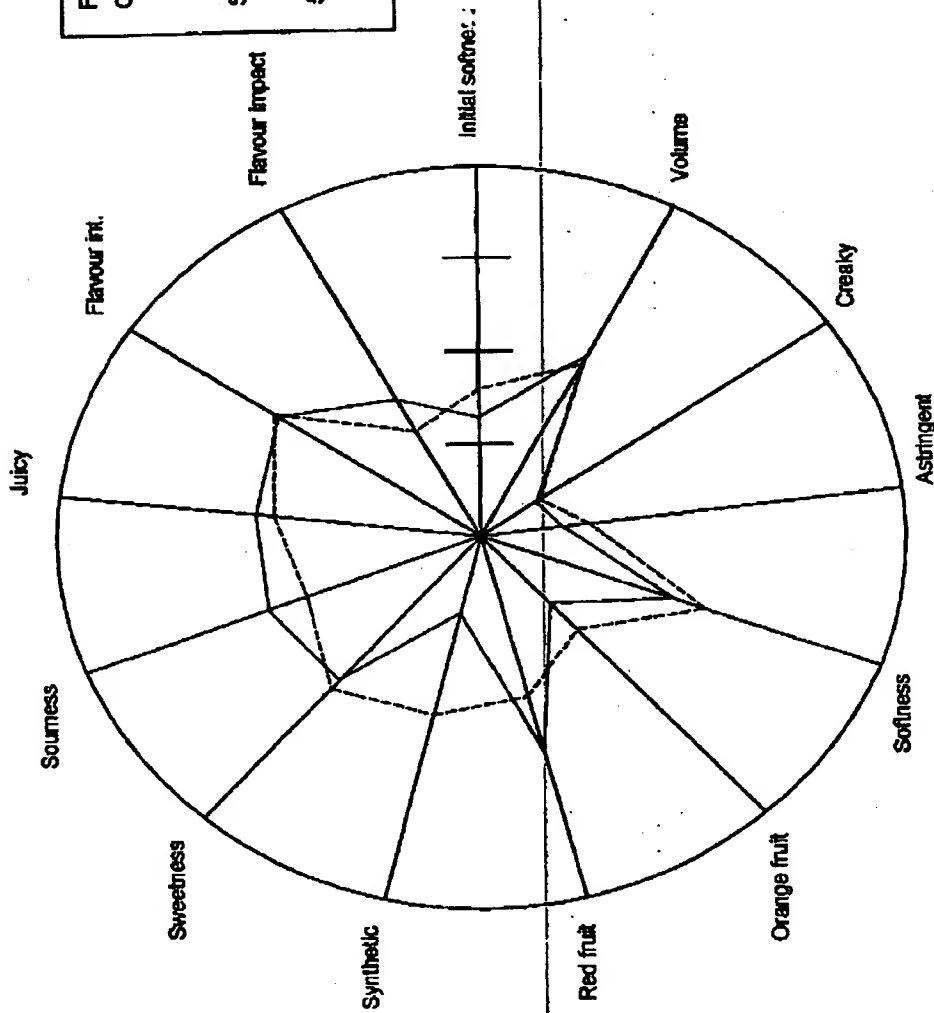


Fig. 4

5/12

Modtaget PD
23 NOV. 1998

File : pr88015.frs
Computation of the statistics
Global
5553-42
Mean
5553-46
Mean



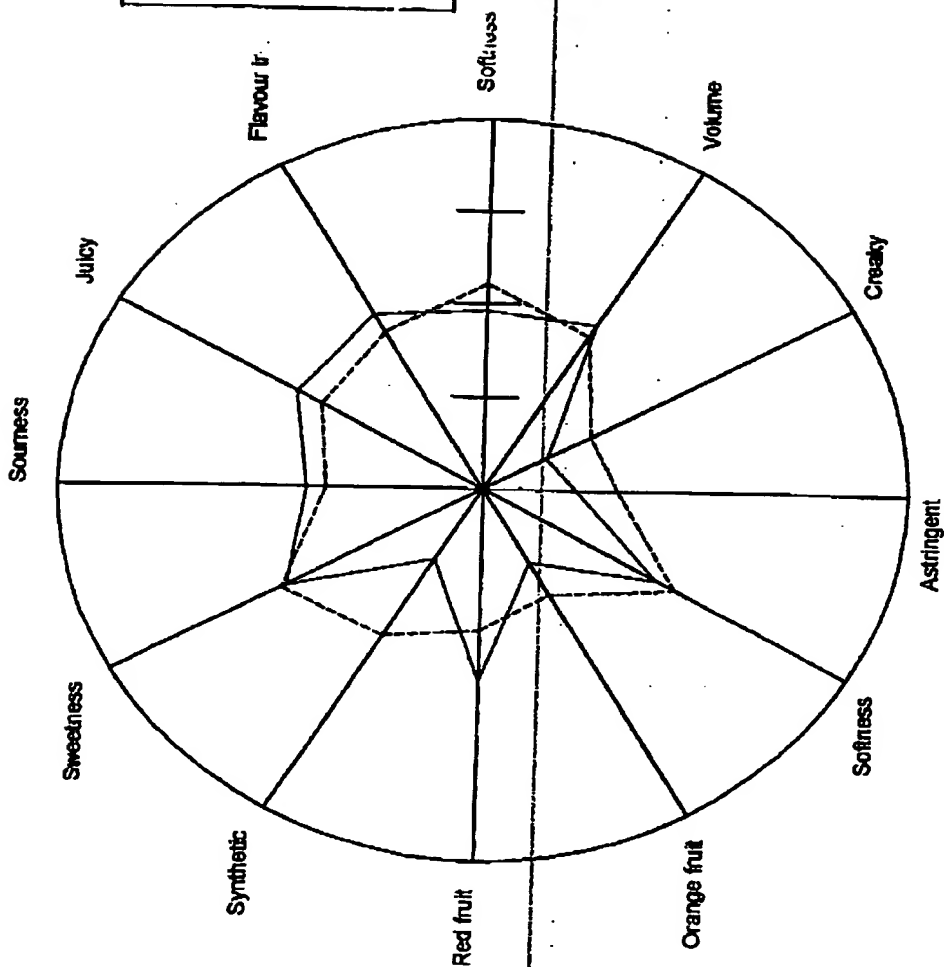
Scale : 0 3,75 7,50 11,25 15

Fig. 5

Modtaget PD
23 NOV. 1998

6/12

File : pr98015.frs	
Computation of the statistics	
Global	
5553-42	Mean
5553-48	Mean



Scale : 0 3,75 7,50 11,25 15

Fig. 6

7/12

Modtaget PD
23 NOV. 1998

File : pr8015.frs	
Computation of the statistics	
Global	
5553-42	Mean
5553-46	Mean

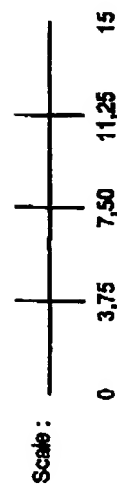
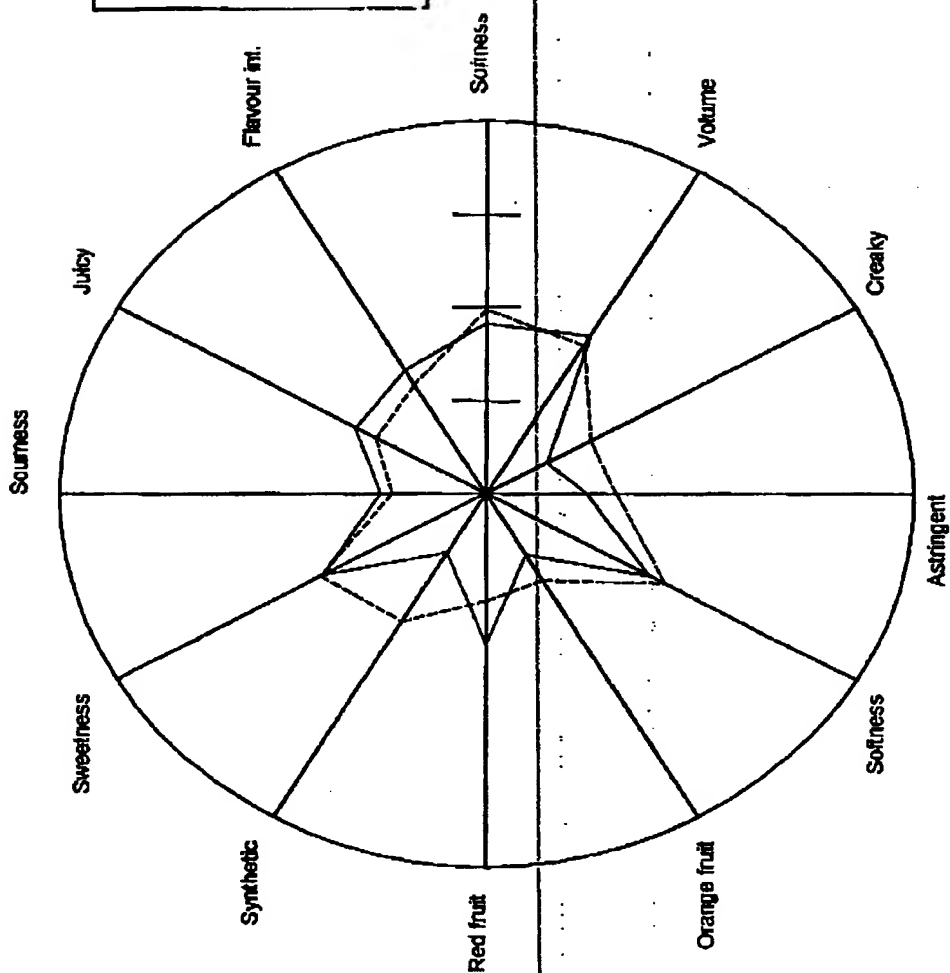


Fig. 7

8/12

Modtaget PD
23 NOV. 1998

File : pr88015.frs	
Computation of the statistics	
Global	
5553-42	
Mean	
5553-46	
Mean	

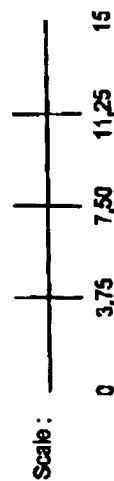
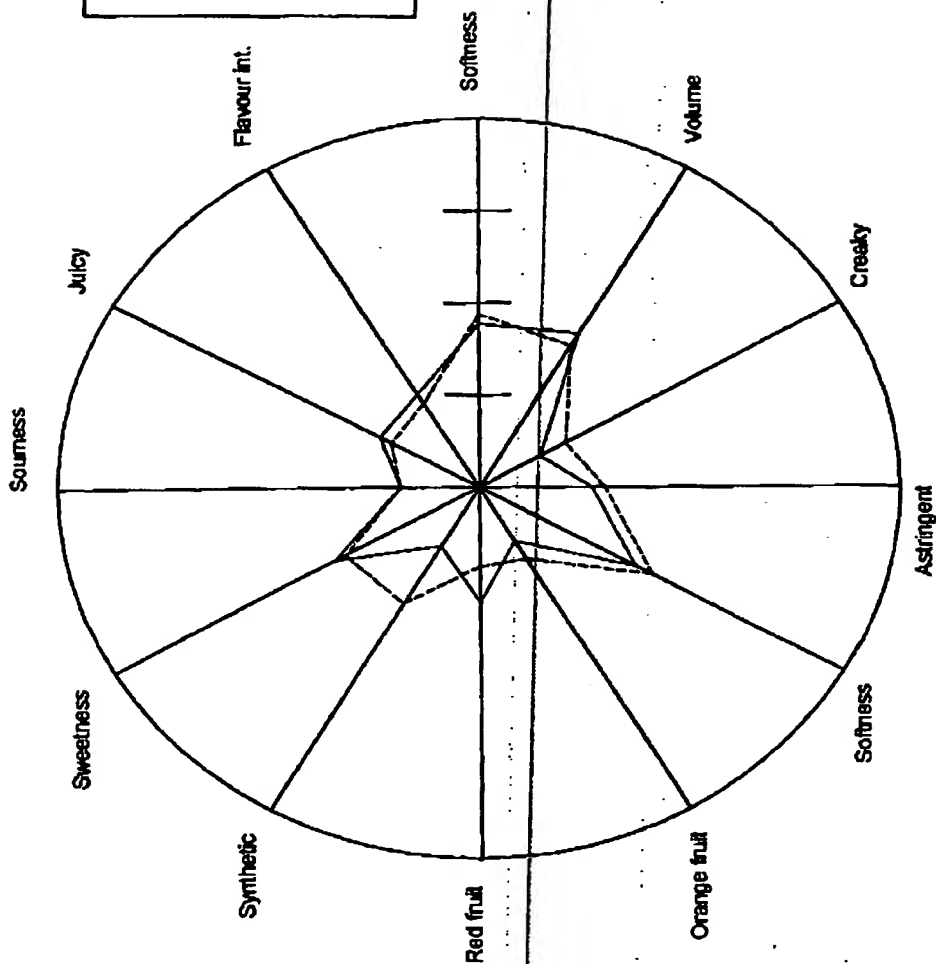
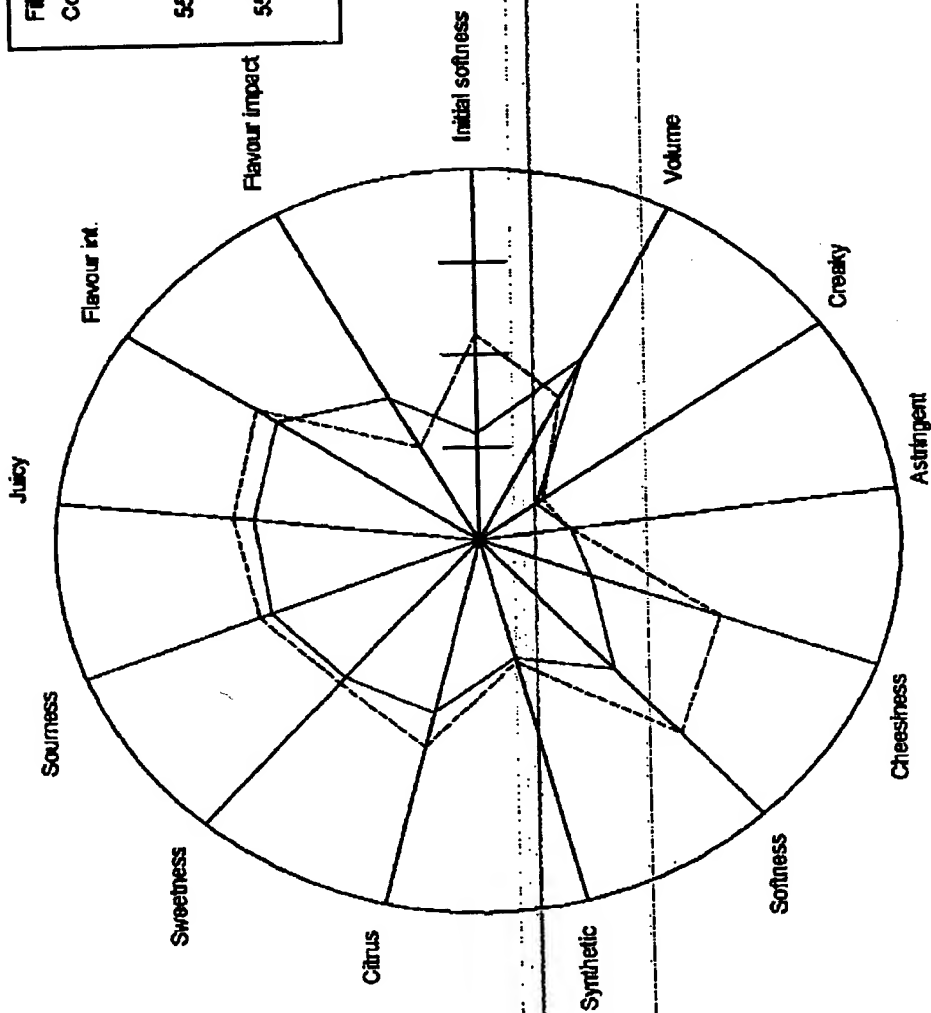


Fig. 8

Modtaget PD
23 NOV. 1998

9/12

File : pr88014.frs
Computation of the statistics
Global
5553-38
Mean
5553-45
Mean



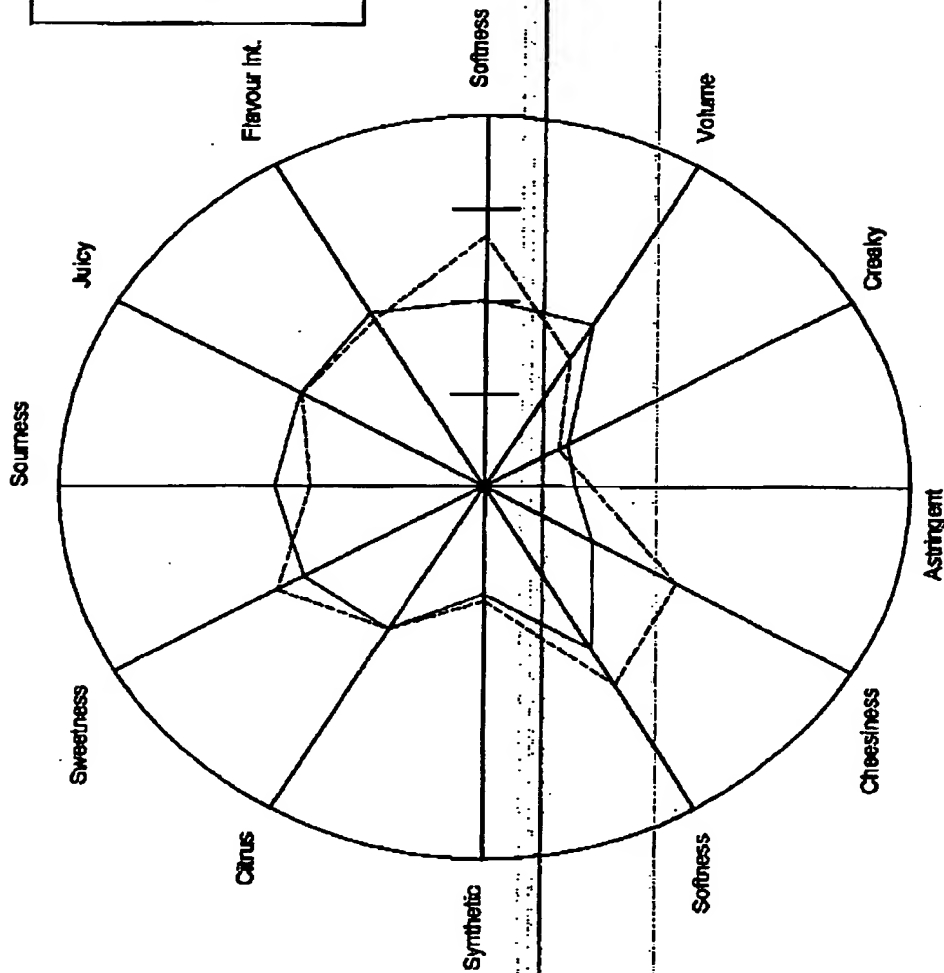
Scale : 0 3,75 7,50 11,25 15

Fig. 9

Modtaget PD
23 NOV. 1998

10/12

File : pr88014.frs	
Computation of the statistics	
Global	
5553-38	_____
Mean	_____
5553-45	_____
Mean	_____



Scale : 0 3.75 7.50 11.25 15

Fig. 10

Modtaget PD

23 NOV. 1998

11/12

File : pr98014.frs
 Computation of the statistics
 Global
 5553-38
 Mean
 5553-45
 Mean

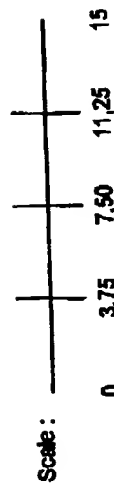
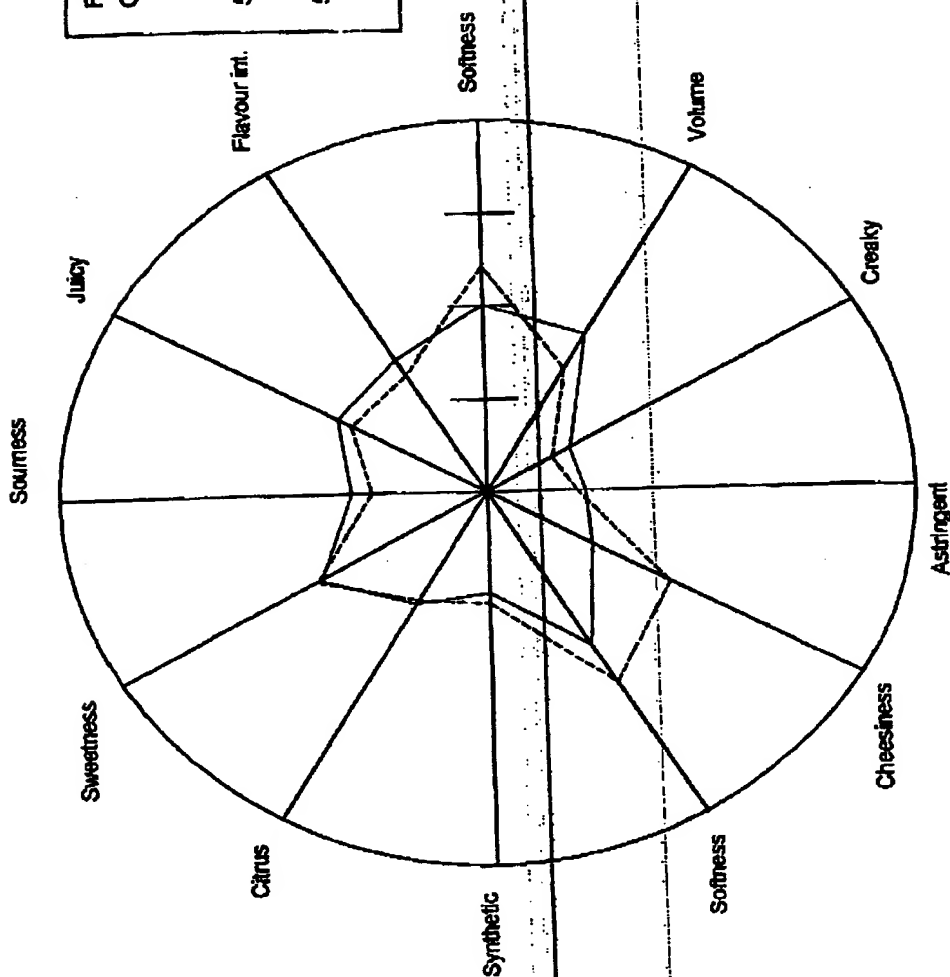


Fig. 11

12/12

Modtaget PD

23 NOV. 1998

File : pr88014.fis
 Computation of the statistics
 Global
 5553-38
 Mean
 5553-45
 Mean

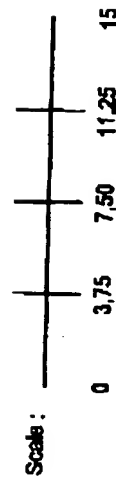
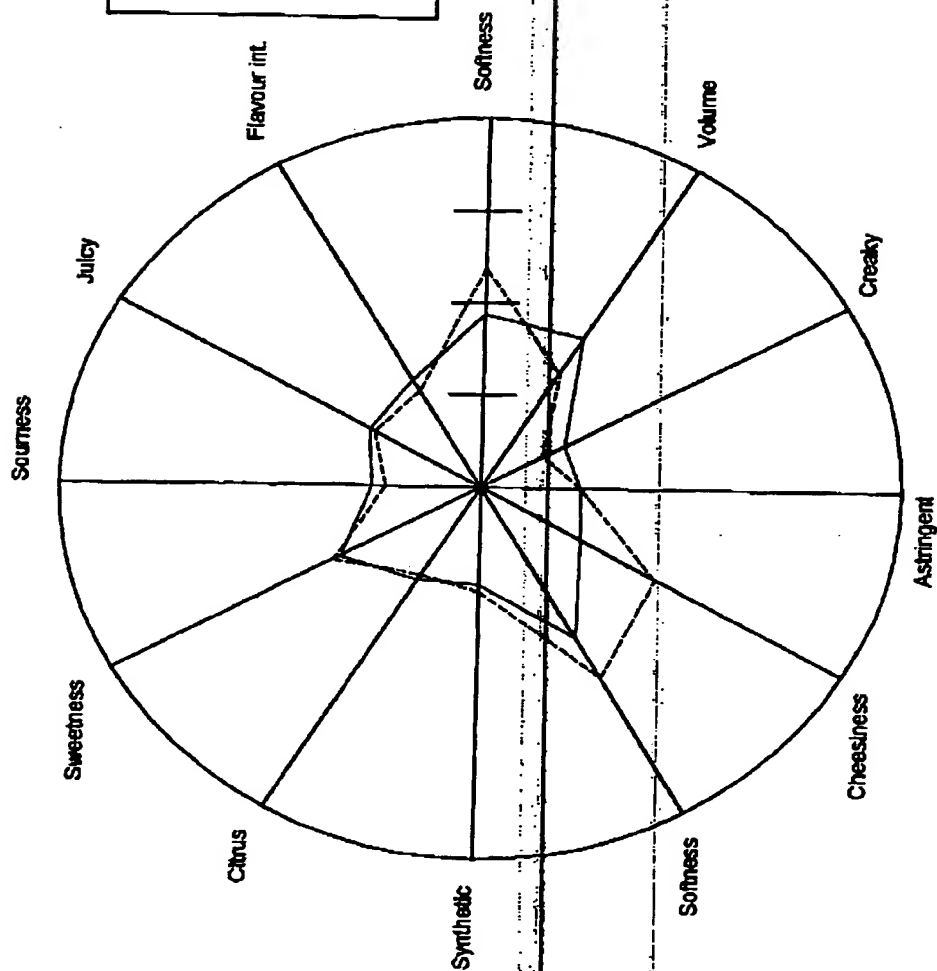


Fig. 12

THIS PAGE BLANK (USPTO)